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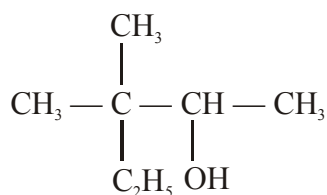
XII CBSE - BOARD - MARCH - 2018

CODE (56/2) SET - 2

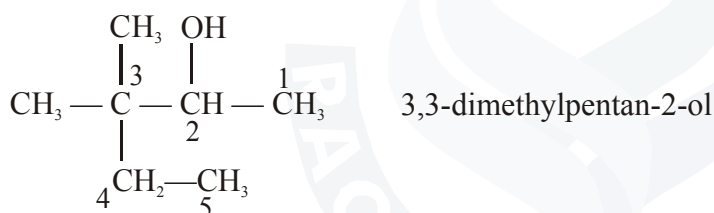
Date: 13.03.2018

CHEMISTRY - SOLUTIONS

1. Write the IUPAC name of the following :



Ans.



Topic: Alcohol ; Sub-Topic: Nomenclature L-Easy XII-CBSE Board Exam Chemistry

2. Out of chlorobenzene and benzyl chloride, which one gets easily hydrolysed by aqueous NaOH and why ?

Ans. Benzyl chloride will get easily hydrolysed as the halogen is attached to 1° carbon atom.

Topic: Halogen derivative ; Sub-Topic: Property L-Easy XII-CBSE Board Exam Chemistry

3. $\text{CO}(\text{g})$ and $\text{H}_2(\text{g})$ react to give different products in the presence of different catalysts. Which ability of the catalyst is shown by these reactions ?

Ans. This ability is known as catalytic selectivity which implies that catalyst also can take part in the reaction.

Topic: Surface chemistry ; Sub-Topic: Catalyst L-Easy XII-CBSE Board Exam Chemistry

4. Write the coordination number and oxidation state of Platinum in the complex $[\text{Pt}(\text{en})_2 \text{Cl}_2]$.

Ans. Coordination number = 6

Oxidation number = +2

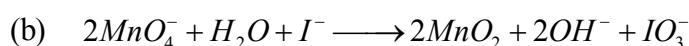
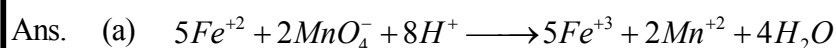
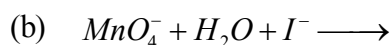
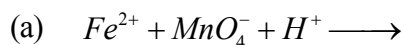
Topic: Coordination compound ; Sub-Topic: Oxidation number L-Easy XII-CBSE Board Exam Chemistry

5. Analysis shows that FeO has a non-stoichiometric composition with formula $Fe_{0.95}O$. Give reason.

Ans. As it is an interstitial compound they don't follow any particular stoichiometric composition.

Topic: d & f-block ; Sub-Topic: Property L-Easy XII-CBSE Board Exam Chemistry

6. Complete and balance the following chemical equations :

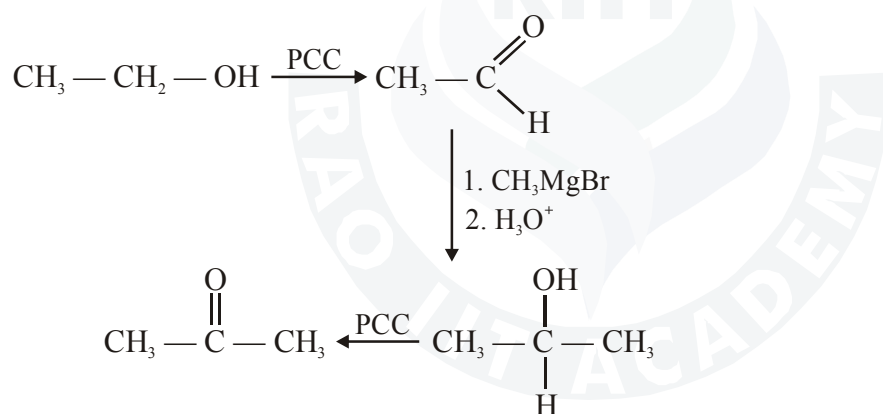


Topic: d & f-block ; Sub-Topic: Preparation and property of compound L-Medium XII-CBSE Board Exam Chemistry

7. How do you convert the following ?

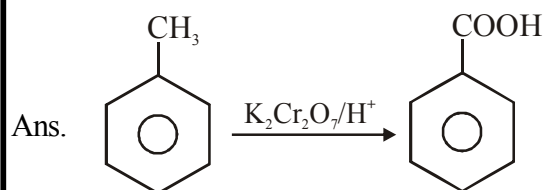
(a) Ethanal to Propanone

Ans.



Topic: Alcohol ; Sub-Topic: Oxidation L-Easy XII-CBSE Board Exam Chemistry

(b) Toluene to Benzoic acid



Topic: Carboxylic acid ; Sub-Topic: Preparation L-Easy XII-CBSE Board Exam Chemistry

(OR)

Account for the following :

(a) Aromatic carboxylic acids do not undergo Friedel-Crafts reaction.

Ans. As $-COOH$ group shows $-m$ effect thus electron withdrawing in nature and makes the aromatic ring deactivated towards electrophilic substitution reaction.

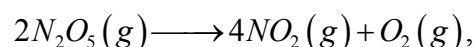
Topic: Carboxylic acid ; Sub-Topic: Property_L-Medium _____ XII-CBSE Board Exam ___ Chemistry

(b) pK_a value of 4-nitrobenzoic acid is lower than that of benzoic acid.

Ans. Because of the presence of $-NO_2$ group which is highly electron withdrawing in nature. The polarity of $-OH$ bond in $-COOH$ increases thus acidity increases and pK_a decreases.

Topic: Carboxylic acid ; Sub-Topic: Property_L-Easy _____ XII-CBSE Board Exam ___ Chemistry

8. For the reaction



the rate of formation of $NO_2(g)$ is $2.8 \times 10^{-3} Ms^{-1}$. Calculate the rate of disappearance of $N_2O_5(g)$.

Ans. $2N_2O_5(g) \longrightarrow 4NO_2(g) + O_2(g)$

$$\text{Rate of reaction} = -\frac{1}{2} \frac{d[N_2O_5]}{dt} = \frac{1}{4} \frac{d[NO_2]}{dt} = \frac{d[O_2]}{dt}$$

According to question

$$\frac{d[NO_2]}{dt} = 2.8 \times 10^{-3} Ms^{-1}$$

$$-\frac{d[N_2O_5]}{dt} = \frac{2}{4} \frac{d[NO_2]}{dt} = \frac{1}{2} \times 2.8 \times 10^{-3} Ms^{-1} = 1.4 \times 10^{-3} Ms^{-1}$$

Topic: Chemical kinetics ; Sub-Topic: Rate of reaction_L-Easy ___ XII-CBSE Board Exam ___ Chemistry

9. Among the hydrides of Group-15 elements, which have the

- Lowest boiling point ?
- Maximum basic character ?
- Highest bond angle ?
- Maximum reducing character ?

Ans. (a) Lowest boiling point = PH_3
 (b) Maximum basic character = NH_3

(c) Highest bond angle = $\overset{\cdot\cdot}{N}H_3$

(d) Maximum reducing character = BiH_3

Topic: p-block ; Sub-Topic: Group 15 property_L-Medium ___ XII-CBSE Board Exam ___ Chemistry

10. Calculate the freezing point of a solution containing 60 g of glyucose (Molar mass = 180 g mol⁻¹) in 250 g of water.

(K_f of water = 1.86 K kg mol⁻¹)

Ans. We know

$$\Delta T_f = k_f \times m$$

$$m = \frac{60/180 \text{ mol}}{0.25 \text{ kg}} = 1.33 \text{ mol kg}^{-1}$$

$$\Delta T_f = 1.86 \times 1.33 \text{ K}$$

$$\Rightarrow \Delta T_f = 2.4738 \text{ K}$$

$$\Rightarrow T_f^\circ - T_f = 2.4738 \text{ K}$$

$$\Rightarrow T_f = T_f^\circ - 2.4738 \text{ K}$$

$$= 273 - 2.4738 \text{ K}$$

$$= 270.5262 \text{ K}$$

Topic: Solution and colligative property; Sub-Topic: Freezing point_L-Easy_XII-CBSE Board Exam_Chemistry

11. An element 'X' (At. mass = 40 g mol⁻¹) having f.c.c. structure, has unit cell edge length of 400 pm. Calculate the density of 'X' and the number of unit cells in 4 g of 'X'. ($N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$)

Ans. We know

$$d = \frac{Z \times M}{N_A \times a^3}$$

For FCC Z is 4

$$d = \frac{4 \times 40}{6.022 \times 10^{23} \times (400 \times 10^{-10})^3} = 4.1514 \text{ gm cm}^{-3}$$

$$\text{Volume of 4gm X is } \frac{4}{4.1514} \text{ cm}^3 = 0.96 \text{ cm}^3$$

$$\text{Volume of 1 unit cell is } (400 \times 10^{-10})^3 \text{ cm}^3 = 64 \times 10^{-24} \text{ cm}^3$$

$$\text{Number of unit cell} = \frac{0.96}{64 \times 10^{-24}} = 1.5 \times 10^{22}$$

Topic: Solid state ; Sub-Topic: Density_L-Medium_XII-CBSE Board Exam_Chemistry

12 Give reasons for the following :

- (a) Measurement of osmotic pressure method is preferred for the determination of molar masses of macromolecules such as proteins and polymers.

Ans. The osmotic pressure method has the advantage over other method as pressure measurement is around the room temperature and the molarity of the solution is used instead of molality. Also as compared to other colligative property its magnitude is large even for dilute solution.

Topic: Solution and colligative property ; Sub-Topic: Osmotic pressure_L-Tough_XII-CBSE Board Exam_Chemistry

- (b) Aquatic animals are more comfortable in cold water than in warm water.

Ans. Because in cold water more oxygen is dissolved.

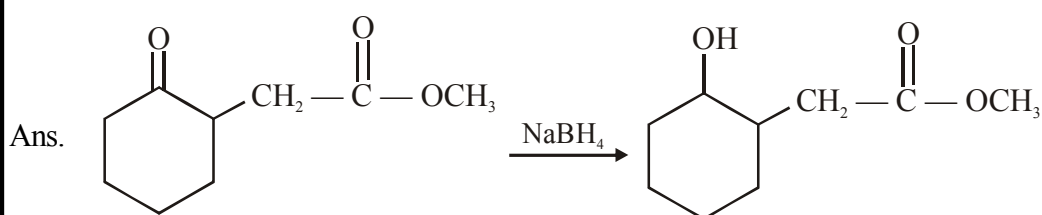
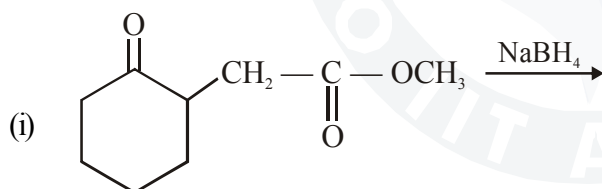
Topic: Solution and colligative property ; Sub-Topic: Solubility of gas in liquid_L-Easy_XII-CBSE Board Exam_Chemistry

- (c) Elevation of boiling point of 1 M KCl solution is nearly double than that of 1 M sugar solution.

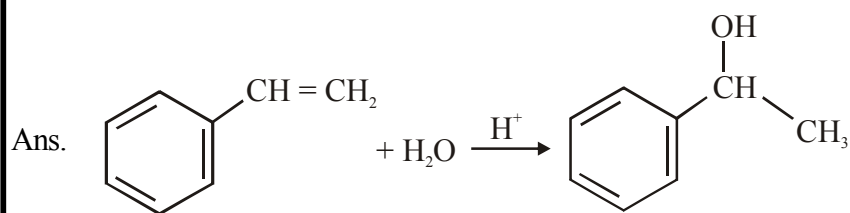
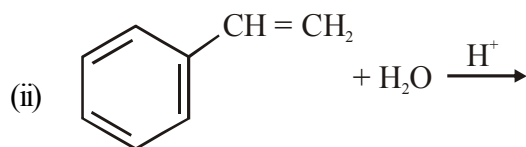
Ans. As colligative property depends only on number of particle and KCl as electrolyte will produce double number of particle of sugar.

Topic: Solution and colligative property ; Sub-Topic: Abnormal molar mass_L-Easy_XII-CBSE Board Exam_Chemistry

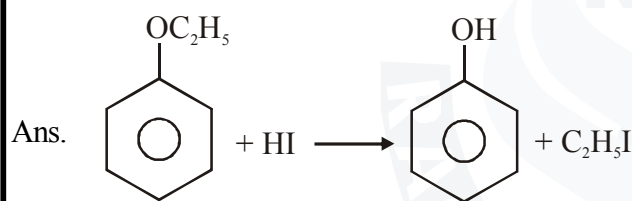
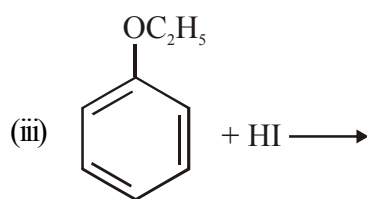
13. Write the structures of the main products in the following reactions :



Topic: Carbonyl compound ; Sub-Topic: Reduction_L-Medium_XII-CBSE Board Exam_Chemistry

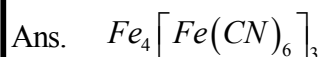


Topic:Alkene ; Sub-Topic:Hydration_L-Medium _____XII-CBSE Board Exam __ Chemistry



Topic:Ether ; Sub-Topic:Reaction_L-Medium_XII-CBSE Board Exam __ Chemistry

14. (a) Write the formula of the following coordination compound :
Iron(III) hexacyanoferrate (II)



Topic:Coordination compound ; Sub-Topic:Nomenclature_L-Medium__XII-CBSE Board Exam __ Chemistry

- (b) What type of isomerism is exhibited by the complex $[Co(NH_3)_5Cl]SO_4$?

Ans. Ionisation isomerism

Topic:Coordination compound ; Sub-Topic:Isomerism_L-Easy__XII-CBSE Board Exam __ Chemistry

- (c) Write the hybridisation and number of unpaired electrons in the complex $[CoF_6]^{3-}$.

(Atomic No. of Co = 27)

Ans. Hybridisation $\rightarrow sp^3d^3$

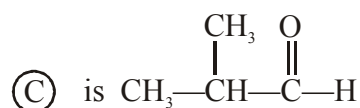
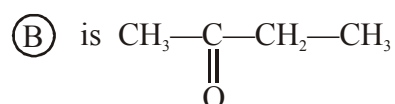
Number of unpaired electron $\rightarrow 4$

Topic:Coordination compound ; Sub-Topic:Valence bond theory_L-Medium__XII-CBSE Board Exam __ Chemistry

15. (A), (B) and (C) are three non-cyclic functional isomers of a carbonyl compound with molecular formula C_4H_8O . Isomers (A) and (C) give positive Tollen's test whereas isomer (B) does not give Tollen's test but gives positive Iodoform test. Isomers (A) and (B) on reduction with $Zn(Hg)/conc. HCl$ give the same product (D).

(a) Write the structures of (A), (B), (C) and (D).

Ans. Structure of



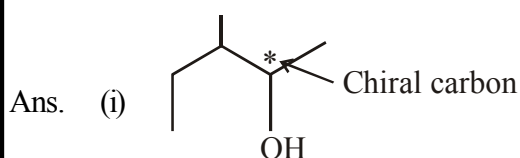
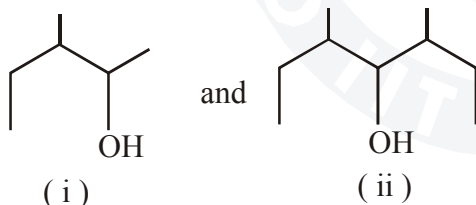
Topic: Carbonyl compounds ; Sub-Topic: Property L-Medium XII-CBSE Board Exam Chemistry

(b) Out of (A), (B) and (C) isomers, which one is least reactive towards addition of HCN ?

Ans. (B) will be least reactive as it contains ketone as functional group and ketones are less reactive than aldehyde towards nucleophilic addition reaction.

Topic: Carbonyl compounds ; Sub-Topic: Property L-Easy XII-CBSE Board Exam Chemistry

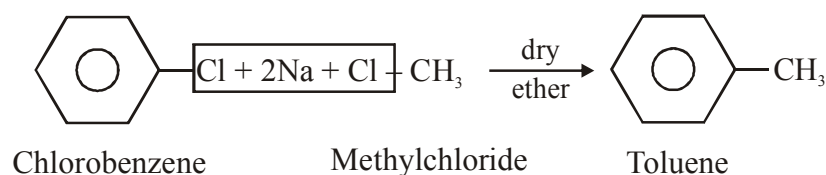
16. (a) Identify the chiral molecule in the following pair ?



Topic: Alcohol ; Sub-Topic: optical property L-Easy XII-CBSE Board Exam Chemistry

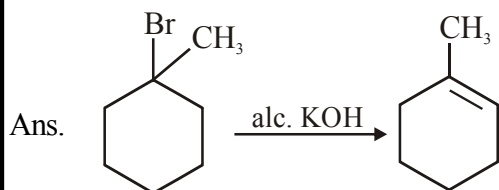
(b) Write the structure of the product when chlorobenzene is treated with methyl chloride in the presence of sodium metal and dry ether.

Ans.



Topic: Halogen derivative ; Sub-Topic: Wurtz reaction L-Easy XII-CBSE Board Exam Chemistry

- (c) Write the structure of the alkene formed by dehydrohalogenation of 1-bromo-1-methylcyclohexane with alcoholic KOH.



Topic: Halogen derivative; Sub-Topic: Property L-Medium XII-CBSE Board Exam Chemistry

17. Give reasons:

- (a) E° value for Mn^{3+}/Mn^{2+} couple is much more positive than that for Fe^{3+}/Fe^{2+} .

Ans. Mn^{+3} / Mn^{+2} has large +ve value because Mn^{+3} can be easily reduced to Mn^{+2} . Mn^{+2} has a half filled d-orbital.

Fe^{+3} / Fe^{+2} has small +ve value because Fe^{+3} is more stable than Fe^{+2} . Fe^{+3} has a half filled d-orbitals.

$\therefore Mn^{+3} / Mn^{+2}$ couple is much more positive than that for Fe^{+3} / Fe^{+2} , Fe^{+3} more stable than Mn^{+3}

Topic: D and F block; Sub-Topic: Property L-Medium XII-CBSE Board Exam Chemistry

- (b) Iron has higher enthalpy of atomization than that of copper.

Ans. Metallic bond in iron is stronger than that of copper. This is due to presence of higher number of unpaired electrons in iron.

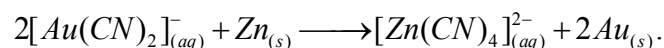
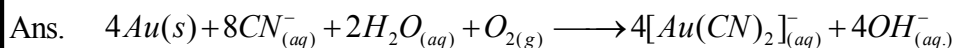
Topic: D and F block; Sub-Topic: Property L-Medium XII-CBSE Board Exam Chemistry

- (c) Sc^{3+} is colourless in aqueous solution whereas Ti^{3+} is coloured.

Ans. Compounds of transition elements are coloured due to presence of unpaired electrons in d-orbitals as they show d-d-transition. In Sc^{+3} there are no d-electrons in Ti^{+3} there is one d-electrons.

Topic: D and F block; Sub-Topic: Colour L-Medium XII-CBSE Board Exam Chemistry

18. Write the chemical reactions involved in the process of extraction of Gold. Explain the role of dilute NaCN and Zn in this process.



Gold is leached with a dilute solution of NaCN in the presence of air (For O_2) from which the metal is obtained later by replacement.

Topic: Metallurgy; Sub-Topic: Leaching L-Medium XII-CBSE Board Exam Chemistry

19. Define the following with an example of each :

- Polysaccharides
- Denatured protein
- Essential amino acids

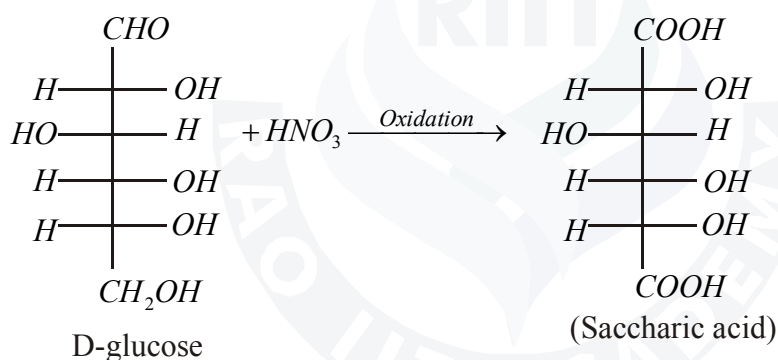
- Ans.
- Polysaccharides : These are the saccharides containing large number monosaccharides units joined together by glycosidic linkage. eg:- starch
 - Denatured protein : Denatured protein are the protein is when subjected to physical change like change in temperature or chemical change like pH, the hydrogen bonds are disturbed and loses its biological activity. eg:- The coagulation of egg white on boiling.
 - Essential amino acids : The amino acids which cannot be synthesised in the body and must be obtained from diet are known as essential amino acids. eg:- Histidine, Valine etc.

Topic:Bio-molecules; Sub-Topic:Definition _L-Easy_XII-CBSE Board Exam _ Chemistry

OR

- Write the product when D-glucose reacts with conc. HNO_3 .

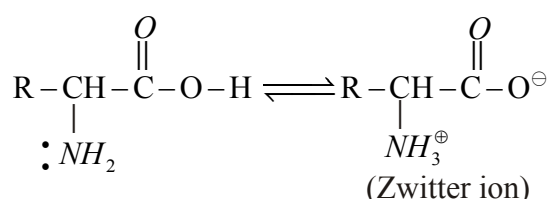
Ans. $\text{D-glucose} + \text{HNO}_3 \longrightarrow ??$



Topic:Bio-molecules; Sub-Topic:Glucose _L-Easy_XII-CBSE Board Exam _ Chemistry

- Amino acids show amphoteric behaviour. Why?

Ans. As amino acid contains both acidic and basic group present into them. i.e. COOH and NH_2 in the same molecule can lose a proton and amino group can accept a proton, giving rise to dipolar ion known as zwitter ion.



Hence, shows amphoteric nature.

Topic:Bio-molecules; Sub-Topic:Protein _L-Easy_XII-CBSE Board Exam _ Chemistry

(c) Write one difference between α -helix and β -pleated structures of proteins.

- Ans. α -helix : It has a polypeptide chain which forms all possible hydrogen bonds twisting it into a right handed screw. (helix)
- β -pleated : It has peptide chain which are stretched out to nearly maximum extension and then laid side by side which are held by intermolecular hydrogen bonds.

Topic: Bio-molecules; Sub-Topic: Nucleic acid_L-Easy_XII-CBSE Board Exam_Chemistry

20. A first order reaction is 50% completed in 40 minutes at 300 K and in 20 minutes at 320 K. Calculate the activation energy of the reaction.

(Given: $\log 2 = 0.3010$, $\log 4 = 0.6021$, $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

Ans. $T_2 = 320 \text{ K}$ $K_2 = \frac{0.693}{20}$

$T_1 = 300 \text{ K}$ $K_1 = \frac{0.693}{40}$

$$\log \frac{K_2}{K_1} = \frac{E_a}{2.303 R} \left(\frac{T_2 - T_1}{T_1 T_2} \right)$$

$$\log \frac{\frac{0.693}{20}}{\frac{0.693}{40}} = \frac{E_a}{2.303 \times 8.314} \left(\frac{320 - 300}{320 \times 300} \right)$$

$$\log \left(\frac{40}{20} \right) = \frac{E_a}{2.303 \times 8.314} \left(\frac{20}{320 \times 300} \right)$$

$$1.6021 - 1.3010 = \frac{E_a}{2.303 \times 8.314} \left(\frac{20}{320 \times 300} \right)$$

$$= \frac{0.3010 \times 2.303 \times 8.314 \times 320 \times 300}{20} = E_a$$

$$= 27764 \text{ J}$$

$$= 27.76 \text{ KJ}$$

Topic: Chemical Kinetics; Sub-Topic: Temperature dependency_L-Medium_XII-CBSE Board Exam_Chemistry

21. (a) Why is bithional added to soap?

Ans. Bithinol is added to medicated soap, to reduce the odour produced by bacterial decomposition of organic matter on the skin.

Topic: Chemistry in everyday life; Sub-Topic: Soap_L-Easy_XII-CBSE Board Exam__ Chemistry

(b) What is tincture of iodine? Write its one use.

Ans. Tincture iodine is 2-3% iodine of alcohol water. It is used as antiseptic.

Topic: Chemistry in everyday life; Sub-Topic: Antiseptics_L-Easy_XII-CBSE Board Exam__ Chemistry

(c) Among the following, which one acts as a food preservative?

Aspartame, Aspirin, Sodium Benzoate, Paracetamol

Ans. Sodium Benzoate - Food preservative.

Topic: Chemistry in everyday life; Sub-Topic: Food preservative_L-Easy_XII-CBSE Board Exam__ Chemistry

22. What happens when

(a) a freshly prepared precipitate of $\text{Fe}(\text{OH})_3$ is shaken with a small amount of FeCl_3 solution?

(b) persistent dialysis of a colloidal solution is carried out?

(c) an emulsion is centrifuged?

Ans. (a) Colloidal dispersion of $\text{Fe}(\text{OH})_3$ is formed this process is called peptization.

(b) On persistent dialysis a colloidal dispersion gets coagulated.

(c) On centrifugation of emulsion, separation of the two liquids will take place.

Topic: Surface chemistry; Sub-Topic: Properties of colloid_L-Medium_XII-CBSE Board Exam__ Chemistry

23. Shyam went to a grocery shop to purchase some food items. The shopkeeper packed all the items in polythene bags and gave them to Shyam. But Shyam refused to accept the polythene bags and asked the shopkeeper to pack the items in paper bags. He informed the shopkeeper about the heavy penalty imposed by the government for using polythene bags. The shopkeeper promised that he would use paper bags in future in place of polythene bags.

Answer the following :

(a) Write the values (at least two) shown by Shyam.

Ans. Shyam is a responsible citizen and has moral values.

Topic: Polymer; Sub-Topic: Property_L-Easy_XII-CBSE Board Exam__ Chemistry

(b) Write one structural difference between low-density polythene and high-density polythene.

Ans. LDPE is branched.

HDPE is linear.

Topic: Polymer; Sub-Topic: Property_L-Easy_XII-CBSE Board Exam__ Chemistry

(c) Why did Shyam refuse to accept the items in polythene bags?

Ans. Polythene is a non-biodegradable polymer and it will accumulate as land fills or if burnt will cause air pollution.

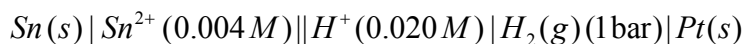
Topic: Polymer; Sub-Topic: Property_L-Easy_XII-CBSE Board Exam__ Chemistry

(d) What is a biodegradable polymer? Give an example.

Ans. Biodegradable polymers are the polymers which are degraded by micro organism within a suitable period so that biodegradable polymers and their degraded products do not cause any serious affects on the environment. eg:- (a) PHBV (b) Dextron (c) Nylon-2-nylon-6

Topic: Polymer; Sub-Topic:Property_L-Easy_XII-CBSE Board Exam__ Chemistry

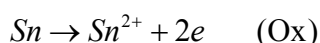
24. (a) Write the cell reaction and calculate the e.m.f. of the following cell at 298 K.



(Given: $E_{\text{Sn}^{2+}/\text{Sn}}^0 = -0.14 V$)

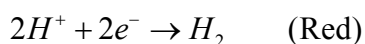
Ans. **Cell reaction :-**

At anode :-

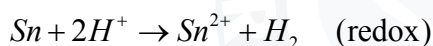


(s) (aq)

At cathode :-



(aq) (g)



$$E_{\text{cell}}^0 = E_{\text{SHE}} - E_{\text{RHE}}$$

$$= 0.0 - (-0.14)$$

$$= 0.14 V$$

$$E = E_{\text{cell}}^0 - \frac{0.0591}{4} \log \frac{[\text{Sn}^{2+}](P_{\text{H}_2})}{[\text{H}^+]^2}$$

$$= 0.14 - \frac{0.0591}{2} \log \frac{0.004 \times 1}{(0.02)^2}$$

$$= 0.14 - 0.029 \log \frac{4 \times 10^{-3}}{2 \times 2 \times 10^{-4}}$$

$$= 0.14 - 0.029 \log 10$$

$$\boxed{E_{\text{cell}} = 0.111 V}$$

Topic:Electrochemisty; Sub-Topic:EMF calculation_L-Medium_XII-CBSE Board Exam__ Chemistry

(b) Give reasons:

(i) On the basis of E^0 values, O_2 gas should be liberated at anode but it is Cl_2 gas which is liberated in the electrolysis of aqueous NaCl.

(ii) Conductivity of CH_3COOH decreases on dilution.

Ans. (i) The standard reduction potential of water is slightly less and therefore it has slightly more chance of getting oxidised. However in concentrated solution of NaCl, oxidation of chloride ions is preferred than water at anode. The unexpected result is due to higher voltage required for electrolysis due to over voltage.

(ii) The number of ions furnished by an electrolyte depends upon degree of dissociation with increase in dilution the degree of dissociation increases as a result molar conduction of acetic acid increases with dilution.

Topic: Electrochemistry; Sub-Topic: Conductivity L-Medium XII-CBSE Board Exam Chemistry

OR

(a) For the reaction



$$\Delta G^0 = -43600 \text{ J at } 25^\circ\text{C}.$$

Calculate the e.m.f. of the cell.

$$[\log 10^{-n} = -n]$$

Ans.

$$\Delta G^0 = -nFE^0$$

$$-43600 = -2 \times 96500 \times E^0$$

$$E^0 = \frac{43600}{2 \times 96500} = 0.23V$$

$$E = E_{cell}^0 - \frac{0.0591}{2} \log \frac{[H^+]^2 [Cl^-]^2}{(P_{H_2})}$$

$$= 0.23 - \frac{0.0591}{2} \log (0.1)^2 (0.1)^2$$

$$E_{cell} = 0.23 - 0.029 \log (10^{-4})$$

$$= 0.23 + (0.029 \times 4)$$

$$\boxed{E_{cell} = 0.3482V}$$

Topic: Electrochemistry; Sub-Topic: EMF calculation L-Medium XII-CBSE Board Exam Chemistry

(b) Define fuel cell and write its two advantages.

Ans. These are voltaic cells in which the reactants are continuously supplied to the electrodes. There are designed to convert the energy from the combustion of fuel directly into electrical energy.

Advantage : -

(1) Fuel cell works with an efficiency of 60 to 70 %

(2) These are no objectionable by products and therefore, its a pollution free source of energy.

Topic:Electrochemisty; Sub-Topic: Fuel cell_L-Medium_XII-CBSE Board Exam__Chemistry

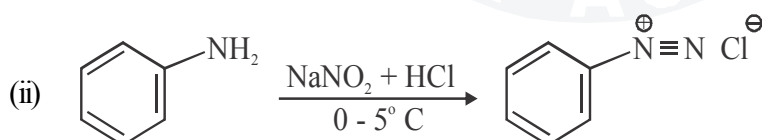
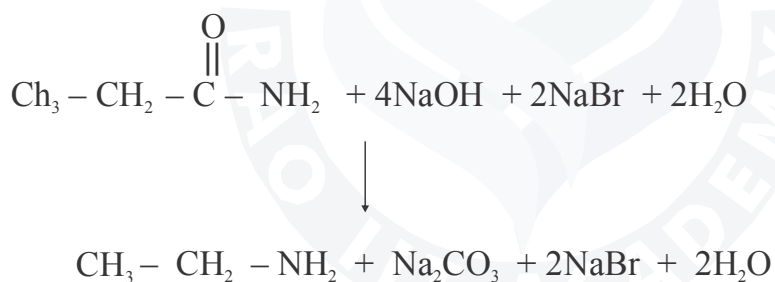
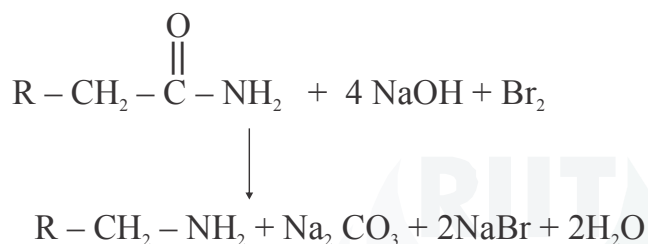
25. (a) Write the reactions involved in the following :

(i) Hofmann bromamide degradation reaction

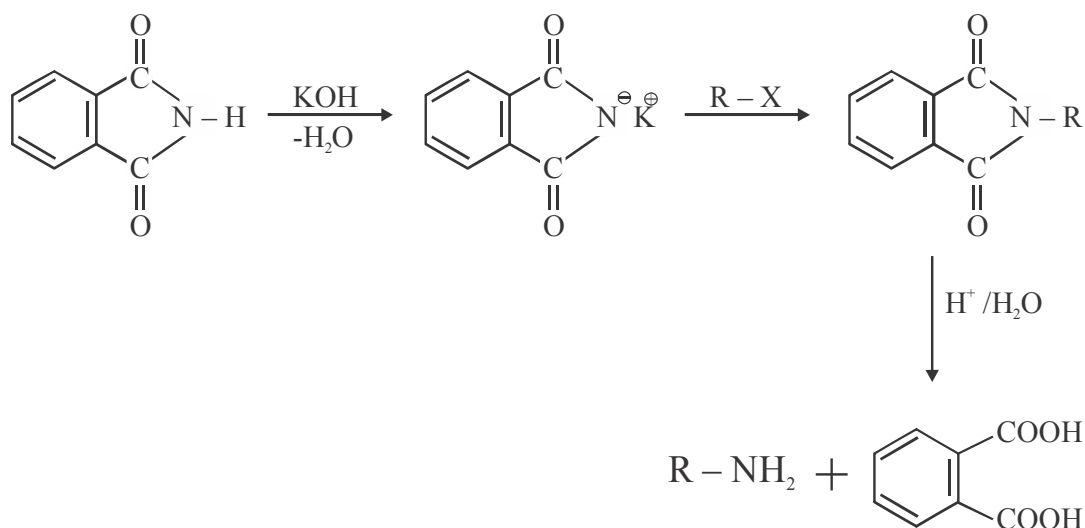
(ii) Diazotisation

(iii) Gabriel phthalamide synthesis

Ans. (i)



(iii)



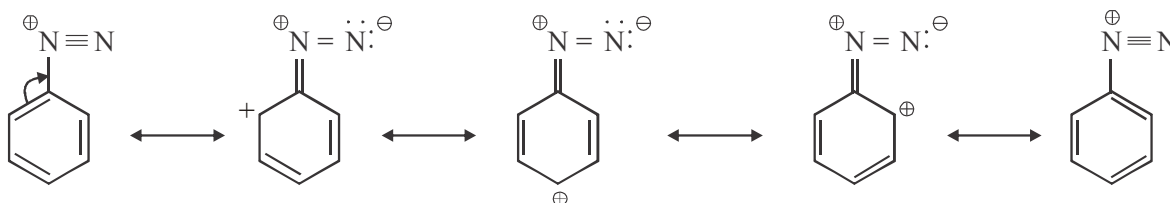
Topic:Amines; Sub-Topic:Reactions_L-Medium_XII-CBSE Board Exam__Chemistry

(b) Give reasons :

- (i) $(\text{CH}_3)_2\text{NH}$ is more basic than $(\text{CH}_3)_3\text{N}$ in an aqueous solution.
 (ii) Aromatic diazonium salts are more stable than aliphatic diazonium salts.

Ans. (i) Tertiary ammonium ion is less hydrated than secondary ammonium ion, thus tertiary amines have less tendency to form ammonium ion and consequently they are least basic.
 As a consequence of combined effects of inductive effect and solvation. Secondary amines are the strongest among amines.

(ii) Aromatic diazonium salts are stable due to the dispersed of positive charge over the benzene ring

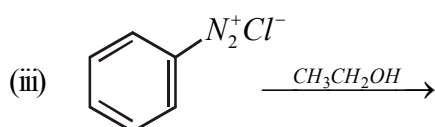
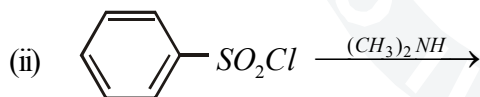
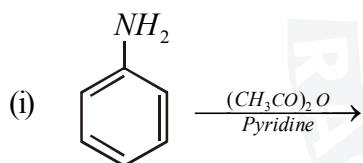


Dispersal of charge is not possible in aliphatic diazonium salts.

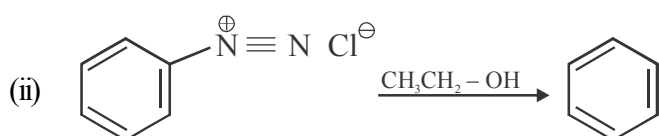
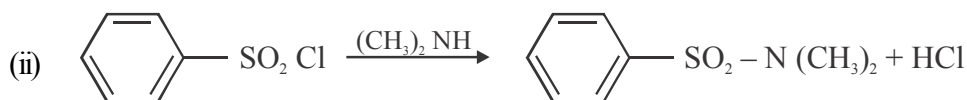
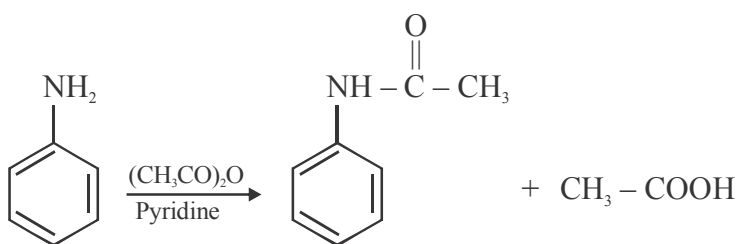
Topic: Amines; Sub-Topic: Diazonium salts L-Medium XII-CBSE Board Exam Chemistry

(OR)

(a) Write the structures of the main products of the following reactions:

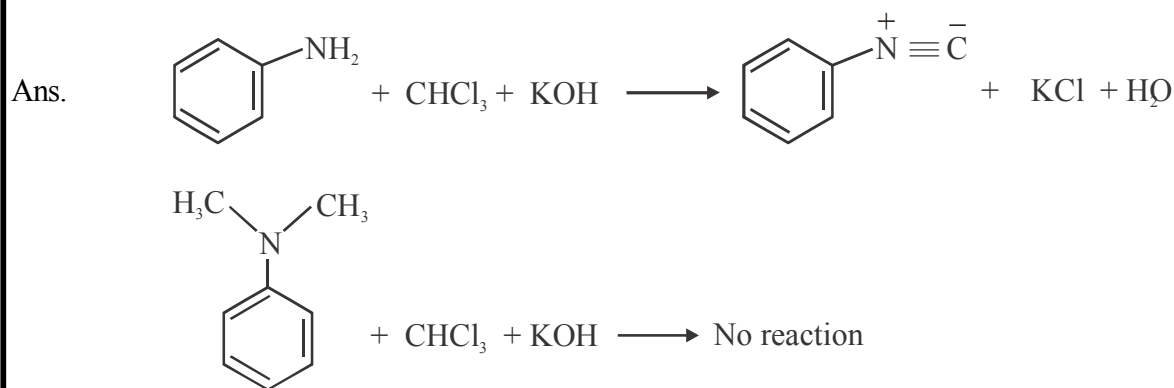


Ans. (i)



Topic: Amines; Sub-Topic: Reactions L-Medium XII-CBSE Board Exam Chemistry

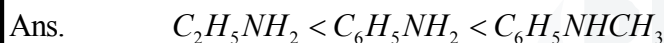
- (b) Give a simple chemical test to distinguish between Aniline and N,N-dimethylaniline.



Carbylamine test can be used to distinguish.

Topic: Amines; Sub-Topic: Reactions_L-Medium_XII-CBSE Board Exam__ Chemistry

- (c) Arrange the following in the increasing order of their pK_b values:



Topic: Amines; Sub-Topic: Basic property_L-Easy_XII-CBSE Board Exam__ Chemistry

26. Give reasons:

- H_3PO_3 undergoes disproportionation reaction but H_3PO_4 does not.
- When Cl_2 reacts with excess of F_2 , ClF_3 is formed and not FCl_3 .
- Dioxygen is a gas while Sulphur is a solid at room temperature.



In H_3PO_4 oxidation number of polyphorous is +5

and H_3PO_3 oxidation number of phosphorous is +3

Therefore H_3PO_4 can undergo only reduction whereas H_3PO_3 can undergo oxidation as well as reduction.

- Fluorine can exist only in -1 oxidation state whereas chlorine can show positive oxidation states when combined with more electronegative atom.

In ClF_3 oxidation number of Cl is +3 which is possible

- In oxygen molecule, there is $p\pi - p\pi$ overlap between two oxygen atoms forming double bond. The intermolecular forces in oxygen are weak Vander Waal's forces and therefore oxygen exists as a gas on the other hand, the S are linked by single bonds and form polyatomic complex molecules. Hence sulphur in a solid.

Topic: p-block; Sub-Topic: Group-15_L-Tough_XII-CBSE Board Exam__ Chemistry

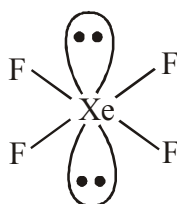
(b) Draw the structures of the following.

(i) XeF_4

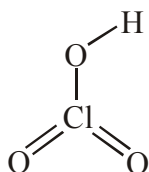
(ii) HClO_3

Ans.

(i)



(ii)



Topic: *p*-block; **Sub-Topic:** Mix_L-Tough_XII-CBSE Board Exam__ Chemistry

(OR)

Q.26 (a) When concentrated sulphuric acid was added to an unknown salt present in a test tube a brown gas (A) was evolved. This gas intensified when copper turnings were added to this test tube. On cooling, the gas (A) changed into a colourless solid (B).

(i) Identify (A) and (B)

(ii) Write the structures of (A) and (B)

(iii) Why does gas (A) change to solid on cooling.

Ans.

(i) NO_2

(ii) N_2O_4

(iii) NO_2 is an odd electron species and hence it dimerizes to give N_2O_4 on cooling.

Topic: *p*-block; **Sub-Topic:** Group-15_L-Tough_XII-CBSE Board Exam__ Chemistry

(b) Arrange the following in the decreasing order of their reducing character:

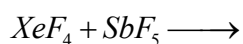
HF, HCl, HBr, HI

Ans.

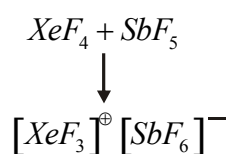
$\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$

Topic: *p*-block; **Sub-Topic:** Group-17_L-Tough_XII-CBSE Board Exam__ Chemistry

(c) Complete the following reaction:



Ans.



Topic: *p*-block; **Sub-Topic:** Group-18_L-Tough_XII-CBSE Board Exam__ Chemistry